

Proceeding: INQUIRY CONCERNING THE DEPLOYMENT OF ADVANCED TELECOMMU Record 1 of 2
CAPABILITY TO ALL AMERICANS IN A REASONABLE AND TIMELY FASHI

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**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
Inquiry Concerning the Deployment)	
of Advanced Telecommunications)	
Capability to All Americans in a)	CC Docket 98-146
Reasonable and Timely Fashion,)	
and Possible Steps to Accelerate)	
Such Deployment Pursuant to)	
Section 706 of the)	
Telecommunications Act of 1996)	

Comments of Information Renaissance

1. Summary

Information Renaissance respectfully submits the following comments in the Federal Communications Commission's (FCC's) Notice of Inquiry (NOI) under Section 706 of the Telecommunications Act of 1996. Sections 2-5 of this document discuss

questions posed in the FCC's August 7, 1998 NOI document on which Information Renaissance has a useful perspective. The questions are addressed in the sequence outlined in the FCC's NOI. Section 6 requests an extension of the comment period to gain further input from the general public - the actual and potential users of advanced telecommunications capability. Section 7 provides a description of Information Renaissance's activities.

Information Renaissance makes the following major points:

1. The FCC should promote the development of advanced telecommunications capability that is high bandwidth, bi-directional and symmetric.
2. The Section 706 goal of providing access "to all Americans" should include users at their homes, regardless of incomes and geographic area.
3. The Internet makes possible a growing number of applications that promote education, community development and economic revitalization.
4. The growing number of Internet applications and their data-intensive nature require increasing access to advanced telecommunications capability.
5. Non-traditional methods should be encouraged to stimulate demand and encourage the deployment of advanced telecommunications capability in under-served areas.
6. An additional comment period should be provided to gain input from actual and potential users of advanced telecommunications capability.

2. Definition of "Advanced Telecommunications Capability" (NOI, Section II.A.1) Paras. 13-17.

Paragraph 13 of the NOI seeks comment on the meaning of "advanced telecommunications capability" and on the meaning of the terms which comprise its

statutory definition: “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.”

Information Renaissance believes that the definition of advanced telecommunications capability should include high bandwidth, bi-directional and symmetrical features. The requirement for “switched” capability should also include “packet-switching” and not be limited to circuit-switching. Advanced telecommunications capability should be sufficient to enable the following services universally: high-quality audio, video conferencing, distributed file systems, and telemedicine.

Advanced telecommunications capability is not any single service. Thus it is not purely a broadcast service, which lacks the function of information exchange; nor is it purely circuit-switching, which is inefficient and resource intensive for many data and audio-visual applications; and it does not necessarily require new physical layer construction, but might involve the installation of new electronics on an existing wiring plant.

The definition should also incorporate the idea of an evolving standard. The FCC should start with a baseline standard defined in terms of specific targeted services, and periodically review that standard to keep it consistent with changing technological possibilities and evolving application needs. The FCC should apply certain measures and incentives to encourage the capability considered advanced at any time. As new technologies become commonplace, these measures and incentives would be removed in the course of the Commission’s periodic review.

The Internet provides a ready example of services that cannot be provided to all Americans by present-day infrastructure. Applications with extensive audio and video components cannot reach the vast majority of end users. Shortcomings exist both in the local loop and in the inter-office and intra-LATA facilities used for aggregation of the local loop traffic. The broad deployment of advanced telecommunications capability as defined above could eliminate these shortcomings.

3. Current and Future Deployment of Advanced Telecommunications Capability -- Existing and Planned Facilities (NOI, Section II.A.2) Paras. 18-58.

The current baseline for telecommunications capability is sufficient to provide residential users with low fidelity audio services, broadcast (or unidirectional) video, and data at less than 64 kilobits per second. The typical baseline capability for office users is simply the aggregation of the same level of services.

The purpose of section 706 and this proceeding is to determine how to raise the bar for such services. These issues are discussed in more detail below.

4. Reasonable and Timely Deployment (NOI, Section II.B) Paras. 59-68.

a. Meaning of "reasonable and timely deployment", Para. 59.

(i) "Reasonable and timely deployment"

Paragraph 50 of the NOI asks for comment on the meaning of the term "reasonable and timely deployment" – whether this requires the adoption of objective targets or a time-specific schedule.

Information Renaissance believes that advanced telecommunications capability evolves and that policies to encourage its development must also evolve. We therefore

believe that the FCC should periodically identify specific capabilities that it plans to encourage and specific, case-determined time schedules to complete those plans.

(ii) “To all Americans”

Subsection (a) of section 706 requires the FCC and state Commissions to encourage the deployment of advanced telecommunications capability “to all Americans (including, in particular, elementary and secondary schools and classrooms)”. Subsection (b) establishes the same scope as the focus of this proceeding – to “determine whether advanced telecommunications capability is being deployed to all Americans” in a reasonable and timely fashion. What does it mean to provide capability “to all Americans”? Information Renaissance believes that the term must be interpreted literally – that Congress intended that “all Americans” include access both by businesses and by individuals in their residences, meaning access at work and at home. With “all Americans” thereby defined as the standard, the next question becomes what method of deployment is “reasonable and timely”. It may not be realistic to expect the immediate deployment of such capability on a universal basis. It is important, however, to retain the ultimate goal of access for all people, regardless of income and geographic location.

The goal of such universal access should not be relegated to the Act’s provisions on Universal Service. The FCC should implement sections 706 and 254 in a complementary way. Both have the goal of universal access. Section 254 addresses the issue of Universal Service funding to ensure such access. Section 706 provides the potential for additional tools to achieve the goal.

In this context, it is also important to identify the Americans who are most at risk of not obtaining access. Much attention is paid to the needs of rural users and the

relatively higher costs of providing facilities in less densely populated areas, which may also suffer from relatively lower incomes. Without discounting that problem, it is also important to note a similar problem of access facing the inner city. Neighborhoods that lie outside the downtown central business district may be more costly to serve than the central business district and may also lack the incomes and use characteristics that demonstrate to providers the profitability of extending advanced telecommunications capability. This problem is true not only for low-income residential users but for small- and medium-sized businesses and organizations located outside the central business district.

b. Demand for Advanced Telecommunications Services, Para. 60.

(i) Nature of demand

Paragraph 60 of the NOI asks for comment on the nature of current and projected demand for advanced telecommunications capability. In response Information Renaissance notes the following present uses, which serve important community goals, such as education, community development and economic revitalization.

Education:

- ◆ Web searching integrated into classroom instruction and research.
- ◆ Web publishing of school resources and student work.
- ◆ After school access.
- ◆ Parental involvement in the educational process.

Community development:

- ◆ Community groups and non-profit organizations communicating with members for programmatic and organizational purposes (email; electronic newsletters; notices; discussion lists on community issues; online collections of community histories).

- ◆ Political participation (access to government information and documents reflected in 1996 Amendments to the Freedom of Information Act; access to information and registration for government programs and services; voter education projects about candidates and issues).
- ◆ Families, including senior citizens, communicating with family members.

Economic revitalization:

- ◆ Job searches.
- ◆ Advertising of community resources.
- ◆ Online skill training and development.

Some of these uses can be provided with existing facilities and services – although often at low speeds that limit the usefulness of the user's application. The number of users, however, increases continually, and the volume of data received and transmitted by each user also increases, posing a substantial need for additional capability. Also, the anticipated use of inexpensive network computers (or "thin clients") will rely upon high-speed links to network servers. Greater bandwidth is similarly required for the expanding uses of collaborative applications in education, community development and economic revitalization.

More specific data-intensive uses, which are becoming more widespread, include the following:

Education:

- ◆ Increased access to remote data-intensive resources.
- ◆ Increased opportunities for distance learning and collaborative projects through video conferencing.
- ◆ New multimedia modeling, sampling and collaborative applications.

Community development:

- ◆ Online town meetings (which make community and political participation more accessible to single parents, people with disabilities and senior citizens).
- ◆ Online access to Geographic Information Systems (GIS) data for a broad variety of community, political and business uses, such as voter education projects, apportionment proceedings, government-issued construction permits.
- ◆ Telemedicine, increasing the accessibility to medical services and reducing the costs of providing the service.
- ◆ More extensive governmental uses, including contract solicitations and bond issues.

Economic revitalization:

- ◆ Secure Electronic commerce, involving Electronic Document Interchange to facilitate placing of orders and making of payments.
- ◆ Telecommuting.
- ◆ Expanded opportunities for business participation in bidding for contracts; contract materials disseminated electronically; bids & proposals submitted electronically.

(ii) Capability required to meet the needs; fungible capability versus specific kinds

Paragraph 60 of the NOI also asks, in view of the uncertainties over the future direction of applications, whether the best policy is “to stimulate the deployment of ‘raw’ capability that would be fungible enough to satisfy whatever demand evolved.”

Information Renaissance submits that the essential outlines of the uses are sufficiently clear to establish goals. The applications will require increased bandwidth, both on the downstream side, that is used to obtain information, and on the upstream side, which is used to transmit information. The need for capacity in both directions is expanding, but capacity in the upstream direction is most at risk of inattention.

The recent development of asymmetric telecommunications capability appears to be based upon the business model of selling or providing large amounts of information, such as pay per view movies, to consumers. Some of the other uses noted above are not based upon the model of seller/transmitter and buyer/receiver, but are, instead, more equally interactive in terms of the quantities of data exchanged. Those uses involve the collaborations among users in education, community development and economic revitalization.

The nature of the telecommunications capability that should be encouraged, therefore, is with facilities with large amounts of symmetrical bandwidth that are sufficiently flexible to satisfy future demand.

c. Current Deployment of Advanced Telecommunications Services, Para. 61

Paragraph 61 asks for comment on where deployment has occurred, by whom, in what form, and for what customers.

Information Renaissance is based in Pittsburgh. Here, advanced telecommunications capability is being provided by the ILEC through ISDN services and will soon be provided through Asymmetric Digital Subscriber Line (ADSL) technology in selected parts of the City and Allegheny County. ISDN is available to residential and business customers, depending upon the availability of facilities and the ADSL service is being offered to business and residential customers. A limited number of CLECS are providing advanced telecommunications capability in the central business district and in Oakland (the location of several universities) concentrating on services to large businesses and institutional users. The local cable television companies are beginning the deployment of advanced services through cable modems, starting in selected areas

outside the city. Cable companies and alternate LECs also offer traditional data services, with only minor differentiation from the ILEC in services and pricing.

d. Schools, classrooms, and libraries, Para. 64.

Paragraph 64 of the NOI asks for comments about the particular needs of schools and libraries, now and in the near future, and about reasonable and timely deployment for them. Paragraph 64 also asks whether government programs, such as the Schools and Libraries discount program under the Universal Service Fund will make up any shortage in private investment. Information Renaissance has familiarity with these issues through its founders' work with the networking of the Pittsburgh school system and the organization's work with the Schools and Libraries Universal Service discount program.

(i) Special needs, in quantity and quality.

The needs of schools and libraries are similar to the needs of other users on a qualitative basis. This means that they have a need for symmetrical high-bandwidth services. The needs are, of course, larger on a quantitative basis.

Unlike other large users, however, which may be located in dense concentrations of other large users, schools and libraries are generally dispersed in residential areas. Accordingly, schools and libraries often suffer from the same lack of infrastructure as do the neighborhoods in which they are located.

(ii) Effectiveness of Schools and Libraries discount program.

The impact and effectiveness of the Schools and Libraries discount program is unclear. The program is in its first year, and the funds are only beginning to be distributed. The short-term impacts, in terms of effectively providing advanced telecommunications capability to schools and libraries, are, accordingly, not clear. Also

unclear are the longer-term impacts, whereby the increased demands from schools and libraries would attract the deployment of advanced capabilities to the neighborhoods in which the schools are located. This latter issue is discussed in more detail below in the section on measures to stimulate user demand.

e. Possible reasons for slow deployment, Para. 66.

Paragraph 66 of the NOI asks for comment on reasons why parties may believe that advanced telecommunications capability is not being deployed in a reasonable and timely manner. Information Renaissance identifies five possible reasons.

(i) Protection of investments in technologies underlying existing facilities

Companies with substantial sums of funds invested in technologies that are already deployed have a natural tendency to encourage the fullest use of those resources. When the companies' services are not subject to competition from other providers, the companies with existing investments in older technologies may be slow to deploy new technologies themselves. In the worst case, such companies may exercise market and other power to discourage or prevent the entry of new providers who would introduce the new technologies

(ii) Uncertainty over investment priorities

A second reason relates to the pace of technological development and the resulting uncertainty over which technologies should receive the attention and investment resources of providers. Deployment of new technologies on a large scale may require the expenditure of substantial sums of funds, and providers may be cautious to avoid spending large sums of money on capabilities that may quickly become obsolete.

(iii) Uncertainty over implementation of the Telecom Act

A third reason relates to the efforts of the FCC and state commissions to implement the competition-inducing provisions of the Telecom Act. The Telecom Act requires the use of mechanisms, such as unbundling and resale, to spur the entry of new providers and encourage the development and deployment of new and advanced telecommunications capabilities. The terms approved by the regulatory agencies have been challenged by potential entrants as being insufficient to encourage competition.

In addition, the Telecom Act prohibits the entry of former Regional Bell Operating Companies (RBOCs) into the long distance market until the RBOCs have complied with the Act's requirements to open the local exchange market to competition. Long distance carriers may be objecting to the unfairness of the competition-inducing terms established by the agencies and postponing their own entry into the local exchange markets to protect their competitive positions in the long distance market.

(iv) Decreased competition resulting from mergers

A fourth reason, related to the first and second reasons, may be merger activity and the increasing concentration among telecommunications service providers. Companies entering into mergers argue that the greater concentration of resources is necessary to undertake the large capital investments required to deploy advanced telecommunications capability. Critics argue that the mergers eliminate potential competitors that might otherwise deploy advanced capabilities and that the larger company has the market power to preserve its embedded investments and prevent the entry of further competitors.

(v) Lack of effective demand

A fifth reason may be lack of effective demand. Providers target customers that present the greatest profit opportunities and proceed slowly, if at all, to deploy facilities to serve other customers. Reasons may include the high cost of deploying facilities to such customers, the lack of perceived demand, or a combination of those factors.

Measures to stimulate demand and deployment are discussed below in section 5.

The FCC should be attentive to all of these possibilities.

5. Removing Barriers to Infrastructure Investment and Promoting Competition (NOI, section II.C) Paras. 69-84.

a. Recommendations on use of price-cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment, Paras. 69-70.

(i) Measures to promote competition: refinement of terms for Unbundled Network Elements and Resale

As noted above, potential competitors in the local exchange market have been slow to deploy facilities and competing services based upon their claims that the terms approved by the FCC and state commissions for the unbundling of network elements, resale and collocation are not sufficient to provide profitable deployments of facilities. Proceedings are underway before state commissions, including the Pennsylvania Public Utility Commission, to determine whether the terms need to be modified.

The FCC should also address these issues, especially in regard to the whether the terms provide sufficient access to unbundled network elements required to provide advanced telecommunications services, such as DSL technologies.

(II) Review of mergers

The FCC should explicitly include in its review of proposed mergers the issue of the impact that the mergers will have on the deployment of advanced telecommunications capability. As noted above, mergers may be used to gain and preserve market power or they may be used to gain access to the resources required to deploy advanced telecommunications capability on a large scale. The FCC should review proposed mergers from these perspectives and attach appropriate conditions in its disposition of the companies' requests.

(III) Measures to promote demand

A basic economic principle is that the supply of a product grows to satisfy the demand for the product. With advanced telecommunications capability, however, the growth of demand depends, in important part, upon the supply of the capability.

The Internet is a relatively new creation. People can use the Internet for important social and economic purposes, and new uses for the technology are being developed at a steadily increasing rate. However, the growth of the uses and the rate at which existing and new users expand their use of the applications depends in large part upon people's familiarity with Internet technology and their awareness of how they can use the technology to help themselves.

In an important sense, therefore, access to the Internet is important to the increased demand for access. The increased demands should encourage further growth in supply.

The following discussion describes three mechanisms that can be used to stimulate demand and supply of advanced telecommunications capability.

◆ **Shared public infrastructure**

Infrastructure that is shared among various public sector users can aggregate enough demand to make a region more attractive to profit driven suppliers. Those users can also benefit from economies of scale in the supplied infrastructure.

Information Renaissance works with community groups and residents to establish community access sites to bring Internet access to residents who may be otherwise be unable to gain access to the necessary resources. The primary objective of the sites is capacity-building – to help people gain tools to solve problems. The computer access sites give communities access to the technological power of the Internet and enable communities to focus on problems which the communities consider important and in ways they control.

Community access sites aggregate demand in central locations and educate the public to the power and usefulness of the technologies. The aggregation provides greater profit opportunities for service providers and leads to the wider use and economic demand for the services.

Equally significant, the sites rely upon partnerships for the resources required to establish and operate them. Information Renaissance uses two kinds of partnerships. The first set of partnerships includes foundations, government agencies and private corporations, which provide funds and hardware for the computer networks. The second set includes collaborations with community groups to establish and provide sites and personnel for a sustainable operation.

Our experience suggests that incentives for the establishment of shared public networking infrastructure could greatly increase the scope of municipal partnerships

involving schools, libraries, government agencies and community groups. A possible model for such incentives may be found in the “institutional networks” established as part of many cable television franchise agreements. Such networks provide infrastructure reserved for public sector use and maintained as a shared public facility. Without incentives for the establishment of infrastructure of this type, it is likely that each major public organization - the school system, the library system, the public safety system, etc. - will seek to establish separate and redundant networks. While such networks can bring significant profits to network suppliers, they are intrinsically hard to maintain and ultimately limit the scope of public access to network facilities and resources.

♦ **Partnerships to help stimulate demand.**

Information Renaissance supports the proposal of the Alliance for Public Technology (APT) to create a task force to develop community/provider partnerships to create demand-pull incentives for infrastructure development for residential and other under-served areas. Our experience with the development of community networks shows that such partnerships can be useful to stimulate demand for advanced telecommunications capability and services in under-served areas. It also shows the extensive need for such partnerships.

The effectiveness of the Task Force will depend upon the participation of the communities affected. This participation can be encouraged in several ways. First, community representation is important in the membership of the Task Force. Second, the Task Force’s work must be open to the public. That means that the public must have access to the Task Force’s meetings and processes. It also means that the Task

Force should actively recruit public input into its reviews. There should be an active outreach program to publicize the Task Force's work and solicit public participation. The outreach effort should use physical forums and online mechanisms to publicize the Task Force's work, to educate the public on the possibilities and issues, and to create a broad public discussion.

◆ **Adjustments to the Schools and Libraries discount program**

The discounts under the Schools and Libraries discount program under the Universal Service fund translate into substantial purchasing power. This power may attract the attention, facilities and services of telecommunications service providers. The opportunity to form consortia of schools and libraries provides further for the aggregation of demand and the stimulation of investment. The Schools and Libraries discounts may not be sufficient, however, to attract advanced capability sufficient to address the remaining needs of an under-served area.

The Task Force on Universal Service established by the Pennsylvania Public Utility Commission has acknowledged the potential of the discounts and consortia to stimulate infrastructure development but noted that the Schools and Libraries discount program discourages school and library consortia from including other entities, such as municipalities, community groups and small businesses. The Task Force's report was approved by the PUC on March 19, 1998 in its investigation on Universal Service. See Re: Formal Investigation to Examine and Establish Updated Principles for Telecommunications Services in the Commonwealth; Final Report and Recommendation of the Universal Service Task Force, Docket No. I-00940035 (Order entered March 19, 1998). The Pennsylvania Task Force stated that larger mixed

consortia could have a greater impact on infrastructure development. It recommended further research to determine the best means to take advantage of a common, single source to advertise aggregated demand. It stated that such a mechanism could be implemented at the state level but that it would be more effective at the federal level.

Information Renaissance recommends that the FCC take all possible measures to facilitate the establishment of consortia under the Schools and Libraries program and that it recommend to Congress that eligibility for the discounts be expanded to include community groups and non-profit organizations. The addition of these other groups will substantially expand the purchasing power of users in under-served areas and attract the extension of advanced capabilities to those areas.

6. Request for Additional Public Comment

Paragraph 12 of the NOI welcomes comment “from those who could be directly affected by the outcome of this proceeding, such as consumers, schools and libraries, and rural health care providers.” Schools, in particular, should have the opportunity to present input, as their classrooms are specifically targeted under section 706 for analysis. Unlike the other likely participants in this proceeding, actual citizen users of services and dispersed organizations, such as schools and libraries, generally lack the resources and organization to gear up quickly for a proceeding like this. Information Renaissance, accordingly, requests that the public comment period for the NOI be extended or that a further public comment period be established to gain input from the actual and potential users of the service.

7. Background on Information Renaissance

Information Renaissance and its founding personnel have experience in three areas relevant to this proceeding: (1) the establishment of community networks serving

community groups, non-profit organizations and residents in urban neighborhoods; (2) the establishment of networks in urban schools; and (3) the conduct of online seminars related to the Universal Service Schools and Libraries discount program. Our experience has given us familiarity with the needs of actual residential users and users who gain access through community schools, libraries and other community access sites.

Our experience stems from Information Renaissance's three categories of programs – programs that provide access through community networks, programs that advocate regulatory policies to improve access and programs that encourage the development of online resources. The overall mission of Information Renaissance, which was formed as a not-for-profit corporation in January 1996, is to promote the development of network infrastructure in support of education, community development and economic revitalization.

a. Access through community networks.

Information Renaissance was formed as an outgrowth of Common Knowledge: Pittsburgh, a pioneering school networking effort in the Pittsburgh Public Schools, funded by the National Science Foundation. Common Knowledge explored methods to establish a metropolitan area network among the Pittsburgh Public Schools, to connect these schools to the Internet and to make use of networking technology in the classroom. Subsequently, in Bridging the Urban Landscape, a program funded by the Department of Commerce's Telecommunications and Information Infrastructure Assistance Program, we helped extend this access to community groups. The Bridging the Urban Landscape program involved community access sites, online resources for educational use and research into connectivity options.

The current work of Information Renaissance extends Internet connectivity to residential areas. We help community groups establish computer labs and access points where the public can use computer technology and the Internet. We also work with the Housing Authority of the City of Pittsburgh to establish community-based networking facilities for public housing residents. These are the kinds of services that bring the benefits of advanced telecommunications services to the potential “have-nots”, such as students in need of computer facilities and Internet access which their families cannot afford.

An essential thread in each of the projects is affordability and sustainability. We regularly aggregate demand through shared infrastructure to achieve physical and economic scales of efficiency. We also train residents to operate and maintain the systems and to develop new community-based applications.

b. Access through improved regulatory policies.

We have also been active in the development of Universal Service policies on the state and federal levels. In 1996, we conducted an on-line seminar for teachers and librarians to review and comment on the FCC’s proposed rules for Universal Service. The seminar educated the participants about the FCC’s proposals and the underlying issues and obtained, organized and submitted their comments to the agency. Last fall, we conducted a similar seminar on behalf of the Governor’s Office of Information Technology and presented the results to the Pennsylvania Public Utility Commission. The FCC seminar involved 500 participants representing 50 states and Puerto Rico. The Pennsylvania seminar included 400 registrants, representing 56 of Pennsylvania’s 67 counties.

c. Access to content.

Our third and related work area involves the creation of online resources. These include a variety of educational and governmental resources. As part of the Universal Service seminars, we helped encouraged the online placement of relevant government documents, which would have otherwise been largely unavailable to the public. These materials are available at <http://www.info-ren.org>

Respectfully submitted,

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